



The 12th Annual
CONTINUING CHALLENGE
HazMat Workshop
September 4-7, 2001
The Radisson Hotel • Sacramento, CA

Compressed Gas Cylinder Emergencies



H. Dieter Heinz

HLI

Objective



To give students hands on training when dealing with known and unknown compressed gases. How to deal with leakers.

What class will achieve:



- How to distinguish between liquefied and non-liquefied gases.
- How to identify cylinder ownership.
- Use of draeger tubes for monitoring.
- Use of pH paper for acidic/basic gases.
- Use of other monitoring devices.
- Difference between a neck leaker and non-neck leaker.
- Identify valve type and safety relief device to ID gas choices.
- Determination of options available on how to handle.
- Organizations/Companies which may be able to help.

What class will achieve:



- Use of 2-stage, 1-stage regulators.
- Use of manual valves for low pressure, liquefied gases.
- How to take a gas sample (transfer to sample cylinder).
- How to properly purge regulators, lines, etc.
- How to transfer.
- How to transfer a liquefied gas.
- Use of scrubbers.
- Flare (Burn units).
- Why you should not use color code.

What class will achieve:



- What agencies need to be contacted.
- What can be vented into atmosphere and what can not.
- Use of burn units.
- Cylinder leak cabinets.
- Cylinder coffins.
- Can we transport off-site? What must be done.
- How to decommission a cylinder.
- What not to transfer (Acetylene).

Materials needed for class:



- Level A PPE
- Wrenches
- Cylinders
 - Non-refillable
 - Low pressure
 - High pressure
 - Cryogenic
 - Lecture bottle
- Valves
 - Poison
 - Corrosive - Low pressure
 - Corrosive - High pressure
 - Flammable - Low pressure
 - Flammable - High pressure
 - Non-flammable
- 2-stage Regulator
- 1-stage Regulator

Materials needed for class:



- Manual valve (stainless & brass)
- Adaptors
- Tubing
- Draeger tubes
- Monitors
- pH paper
- Heating tape
- Cylinder Valve caps & dust caps
- Placards
- Bill of Landing
- Cylinder labels

Overview



- Definition
- Sources
- Types
- Risks
- Options
- Anatomy of a cylinder

Overview



- Evaluation
- Handling
- Equipment
- Coordination with agencies
- Disposition
- Recovery Vessel
- Emergency Response Planning

Overview



- Emergency Response Equipment
- Decontamination
- Where to get more information

Definition



- (a) Does not contain a label or it is suspected that the label has been altered or tampered with;
- (b) A cylinder whose valve and relief device configuration does not correspond to its label according to industry standards;

Definition



- (c) A cylinder whose contents may have been contaminated, such as improper connection with other cylinders, process equipment or the atmosphere;
- (d) A cylinder that is suspected of being used for something other than its intended service since the last fill.

Sources



- Customer
- Supplier/Distributor
- Other
 - Fire Department
 - Flea Market
 - Drug Labs

Types



- Non-refillable (disposable)
- Problem Cylinder
 - abandoned
 - unknown contents
 - cylinder condition
 - inoperable valve
 - unstable contents

Risks



- Gases under pressure
- Flammable
- Explosive
- Toxic (poisonous)
- Corrosive
- Oxidizing
- Reactive

Risks



- Public Relations
- Liability
- Injury
- Damage

Options



- Do nothing
- Utilize on-site HazMat Team
- Utilize off-site HazMat Team
- Call Gas Supplier
- CGA (Compressed Gas Association)
- Utilize Environmental Contractor

Anatomy of a Cylinder



- Container
- Valve & Safety
- Collar
- Cap
- Color Code
- Labels

Evaluation of a Cylinder and its Contents



- Trained Experts
- Cylinder Integrity
- Content Identification
- Other Considerations
 - usage
 - ownership
 - valve & safety relief valve
 - color code

Handling of Problem Cylinders



- Use of trained experts

“Cylinders with unknown contents including abandoned cylinders, should be handled assuming a worst-case scenario.”

(CGA Pamphlet P-22)

Handling of Problem Cylinders



- Contaminated Cylinders

“If the contents of a cylinder have been contaminated or are suspected of being contaminated, analysis of the contents should be conducted prior to establishing the handling procedures and disposition.”

(CGA Pamphlet P-22)

Sampling Equipment



- Pressure Requirements
 - Liquefied
 - Non-liquefied
- Oxygen cleaned
- Sample cylinder

Severely Corroded Cylinders



- Consideration should include possibility for cylinder or valve failure during sampling and/or disposal.

Other Equipment



- Personal Protective Equipment
- Monitors
- Remote Control Device
- Cylinder Contamination Device
- Scrubbers
 - Acid
 - Base (Caustic)
 - Burn units

Coordination with local response Agencies



- Fire Service
- EPA
- OES
- Department of Health Services
- Police
- CHP
- Cal Trans

Disposition



- Recovery & Recycle
- Treatment
 - on-site
 - off-site
 - detonation by bomb squad
- Cylinder content disposition
- Cylinder decommissioning

Emergency Response Planning



- Identification of emergency coordinators
- Site plot plan
- Location of types/amounts of hazardous materials
- Location and types of emergency response equipment
- Evacuation routes and assembly areas
- Identity of emergency response personnel

Emergency Response Plan



- Implement Plan
- Qualified Personnel
- Secure Area
- Identify Chemical(s)
- Can we handle?
- Emergency Assistance?
- Implement Decontamination Procedure

Emergency Response Equipment



- Monitors
- Tools
- Materials
- PPE
- Compressed Gas Cabinets (leaker cabinet)
- Cylinder Coffin

Decontamination



- Follow established SOP
- Disposable outer garments & tools
- Encase source of contaminants
- Tape clothing junctures
- Rinsing

Where to get more information



- CGA Pamphlet P-22
- Handbook of Compressed Gases
- NFPA 55
- Effects of Exposure to Toxic Gases
- DOT Emergency Response Handbook
- CGA Pamphlet P-1
- Other CGA gas specific pamphlets